REMARKS

The claims herein have been revised to more clearly express the invention, and also to present apparatus claims directed to a supply chain planning system which are similar to the claims in the parent application that were indicated allowable over the prior art.

Early allowance is respectfully requested.

Should any questions arise, the Examiner is invited to telephone the undersigned attorney for applicant.

Respectfully submitted,

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I hereby certify that the foregoing application is being deposited with the United States Postal Service First Class service with sufficient postage on the date indicated above in an envelope addressed to Assistant Commissioner for Patents, Washington, D.C. 20231.

on May 24, 2001
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	Söhner
Serial No.	:	09/838,793
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Title	:	DATA MODEL SUPPLY CHAIN PLANNING

Assistant Commissioner for Patents
United States Patent and Trademark Office
Washington, D.C. 20231

MARKED VERSION TO SHOW CHANGES MADE

Please cancel claims 21 to 24 without prejudice.

Please amend the following claims:

25. (amended) The method of claim 35 [21], and further comprising the steps of determining [the] a quantity [of] and time for said materials being supplied to each of said manufacturing resources by providing the start time for the first of said activities of the first of said orders, and determining [calculating] said start time for each of said orders that consumes said materials using said data of [information about] temporal constraints between activities;

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supplying the necessary quantity of said materials to each of said manufacturing resources in said manufacturing sequence at said determined tmies based on said determined time [for] and quantity for [of] said materials for respective ones of said manufacturing resources.

26. (amended) The method of claim 25, and further comprising the step of adjusting said start time for one of said activities based on the unavailability of a particular one of said manufacturing resources, and re-calculating the time at which materials need be supplied to each of said manufacturing resources based on said adjusted start time.

27. (amended) The method of claim 35 [21] wherein said data structure [model] further comprises input nodes representing materials consumed by an order and output nodes representing materials created by an order.

28. (amended) The method of claim 27, and further comprising the step of determining a [the] bill of materials for an output material by identifying all of the input nodes corresponding to the output node for said material.

29. (amended) The method of claim 36 [22] and further comprising the step of determining all orders for a specific material and storing said orders in a database of order information.

30. (amended) A method for monitoring the use of resources and materials in a manufacturing sequence, comprising the steps of:

storing [providing a] data [model] representing said manufacturing sequence in a data structure

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said data structure [model] comprising one or more orders representing one or more materials being consumed and/or created in said manufacturing sequence, said orders being linked such that the order that consumes a material follows the order that creates the respective material in said manufacturing sequence,

each of said orders comprising one or more activities representing materials being processed by manufacturing resources, said activities being linked chronologically within each order, said link between activities further comprising data representing [information about the] temporal constraints between said activities, and temporal constraints between activities in different orders in said manufacturing sequence[.] ; and

determining [Determining] based on a [the] start time for a [the] first of the orders [order] whether a specific resource is in use at any given time during said manufacturing sequence.

31. The method of claim 30, and further comprising the step of determining a [the] time and duration for all of said activities directed to [on] a particular one of said manufacturing resources.

32. The method of claim 30, and further comprising the step of chronologically storing in a database table all activities scheduled to take place in said manufacturing sequence, said storing performed using said data representing [information about] temporal constraints between order.

33. The method of claim 30, and further comprising the step of determining the availability of one or more of said manufacturing resources for uses other than said manufacturing sequence by calculating said availability based on said information about temporal constraints between said order for a given manufacturing supply chain.

34. The method of claim 30, and further comprising the step of determining all of said order for a particular one of said materials and [for the purposes of] determining the quantity of said material that is needed for respective [r4espective] ones of said manufacturing resources.

Please add the following new claims.

35. A method for facilitating the dynamic allocation of manufacturing resources and materials in a manufacturing sequence, comprising the steps of:

storing data for said manufacturing sequence in a data structure, said stored data structure comprising one or more orders representing one or more materials being consumed and/or created in said manufacturing sequence, said orders being linked such that the order that consumes a material follows the order that creates said material in said manufacturing sequence, each of said orders comprising one or more activities representing materials being processed by said manufacturing resources, said activities

being linked chronologically within each order, said link between activities further comprising data of temporal constraints between said activities; and

determining a start time for a first activity of said manufacturing sequence and using said data of temporal constraints in said data structure to determine start times for all of said activities that are performed on a particular one of said manufacturing resources.

36. The method of claim 21, wherein said data structure further comprises data representing temporal constraints between said activities in different orders in said manufacturing sequence.

37. The method of claim 21, and further comprising

adjusting said start time for one or more of said activities in said manufacturing sequence; and

using said data structure to dynamically re-calculate said start times for one or more of said activities on subsequent ones of said manufacturing resources.

38. The method of claim 21, and further comprising

optimizing the use of said manufacturing resources in real time by dynamically allocating certain of said manufacturing resources to other uses based on the calculated availability of said manufacturing resources in said manufacturing sequence.

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39. A system for supply chain planning, said system comprising means for storing data and a data structure stored on said means for storing so that an application program can access data therein, said stored data structure comprising:

a plurality of orders stored in the means for storing, each order comprising:

a) one or more activities each representing a working step that is indivisible from a production planning perspective, and each being linked to a reference to all immediately preceding activities;

b) one or more input interface nodes each representing a material consumed by said order, each input interface node being linked to all activities that consume said material; and

c) one or more output interface nodes each representing a material created by said order, each output interface node being linked to all activities that create said material; and

one of said orders being a first order, each output interface node of said first order being linked to a respective input interface node of each of the other of said orders subsequent to said first order that are scheduled to consume the material associated with said output interface node of said first order.

40. The system of claim 39, wherein said reference to all immediately preceding activities each have attributes, said attributes including a minimum and a maximum time interval between the linked activities and a type of temporal constraint.

41. The system of claim 39, wherein each activity has at least four attributes, said attributes including a start time, a finish time, a reference to the resource on which the activity is currently scheduled, and a reference to a list of one or more alternative resources.

42. The system of claim 39, wherein each input interface node contains data identifying a required material, a required quantity, a time at which said required material is required, and any shortage of said required material, said shortage being defined as a difference between the required quantity and the quantity of said required material that is delivered by other orders or stock, each output interface node containing data identifying a created material, a created quantity, a time at which said created material is created, and any surplus of said created material, said surplus defined as a difference between the created quantity and the quantity of said created material that is not yet delivered to other orders.

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43. The system of claim 39, wherein each order has a pre-assigned order number, said data structure further comprising a database table having an entry for each pre-assigned order number matched to a correcponding object identity, which is a reference to the respective order.

44. The system of claim 43, wherein said database table is stored in memory which includes a RAM buffer.

45. The system of claim 43, wherein when an order comprises a plurality of said activities therein, two or more of said activities together constituting an operation, each operation having a pre-assigned operation number, said data structure further comprising a database table having an entry storing each object identity and pre-assigned operation number matched to the earliest activity of the respective operation.

46. The system of claim 39, wherein each material has a pre-assigned material number, said data structure further comprising a database table having an entry for each pre-assigned material number matched to a reference to at least one input interface node at which the respective material is consumed, and an entry for each pre-assigned material

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number matched to a reference to at least one output interface node at which the respective material is created.

47. The system of claim 46, wherein said database table further comprises data identifying each material, said data identifying at least one of plant, storage location, and batch.

48. The system of claim 39, wherein each resource has a pre-assigned resource number, said data structure further comprising a database table having an entry for each pre-assigned resource number matched to a chronological sequence of activities scheduled on the respective resource.

49. The system of claim 39 wherein one of said at least one order has k output interface nodes, representing an order producing k different materials.

50. The system of claim 39, wherein a plurality of activities are grouped to form an operation, and wherein the first activity of said operation represents a set up for

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production, and wherein the successive activities of said operation each represents steps in production.

51. A data structure stored so as to be accessed by an application program for supply chain planning in a data processing system, comprising:

at least one order, each of said at least one order having at least one of:

a) one or more input interface nodes;

wherein each input interface node represents a material consumed by said order; and

b) one or more output interface nodes;

wherein each output interface node represents a material created by said order;

wherein each output interface node of a first order is linked to a reference to the respective input interface node of each subsequent order scheduled to consume the material associated with said output interface node of said first order.

52. The system of claim 51, said plurality of orders including n orders and one subsequent order, each output interface node of said n orders being linked to a respective

input interface node of said one subsequent order such that said one subsequent order consuming the materials supplied by said n orders.

53. The system of claim 51, said plurality of orders including a first order and m subsequent orders, each input interface node of said m subsequent orders being linked to a respective input interface node of said first order such that said first order supplies the material demands of said m subsequent orders.

54. The system of claim 51, wherein each input interface node contains information regarding a required material, required quantity, the time at which said required material is required, and any shortage of said required material, said shortage defined as the difference between the required quantity and the quantity of said required material that is delivered by other orders or stock, and wherein each output interface node contains information regarding a created material, created quantity, the time at which said created material is created, and any surplus of said created material, said surplus defined as the difference between the created quantity and the quantity of said created material that is not yet delivered to other orders.

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55. The system of claim 54, wherein each of said at least one order has a pre-assigned order number, said data structure further comprising a database table having an entry for each pre-assigned order number matched to its object identity, which is a reference to the respective order.

56. The system of claim 51, wherein each material has a pre-assigned material number, said data structure further comprising a database table having an entry for each pre-assigned material number matched to a reference to at least one input interface node at which the respective material is consumed, and an entry for each pre-assigned material number matched to a reference to at least one output interface node at which the respective material is created.

57. The system of claim 56, wherein said database table further comprises identifying information for each material including at least one of plant, storage location, and batch.

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58. A system for supply chain planning, said system comprising means for storing data and a data structure stored on said means for storing so that an application program can access data therein, said stored data structure comprising:

a plurality of orders each representing at least one activity,

each activity representing a working step that is indivisible from a production planning perspective;

each activity being linked to a reference to all immediately subsequent activities; and

each of said at least one activity being linked to a reference to all immediately preceding activities;

said reference to all immediately preceding activities and said references to all immediately subsequent activities each have at least two attributes, said attributes including a minimum and a maximum time interval between activities and a type of temporal constraint.

59. A system for supply chain planning, said system comprising means for storing data and a data structure stored on said means for storing so that an application program can access data therein, said stored data structure comprising:

a plurality of orders each representing at least one activity;

each activity representing a working step that is indivisible from a production planning perspective;

each activity being linked to a reference to all immediately subsequent activities;

each activity being linked to a reference to all immediately preceding activities; and

each order having a pre-assigned order number, said data structure further comprising a database table having an entry for each pre-assigned order number matched to an object identity, which is a reference to the respective order.

60. The system of claim 59 wherein a plurality of said activities within one of the orders constitutes an operation, and wherein each operation has a pre-assigned operation number, said data structure further comprising a database table having an entry for each object identity and pre-assigned operation number matched to the earliest activity of the respective operation.